The road from above: remotely sensed discovery of early modern travel infrastructure in Afghanistan

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Abstract: Caravanserais or 'road inns' were a central aspect of medieval and early modern sociality in Central Asia, as infrastructural investments made by centralized polities to promote long distance exchange, and as locales for providing charitable hospitality. This paper presents data on early modern (16-17th c) caravan networks in Afghanistan, discovered and mapped using satellite imagery and historical data by the Afghan Heritage Mapping Partnership (AHMP) at the University of Chicago. By recording networks of standardized roadside architecture from the Safavid-Mughal period, we generate new information on previously understudied routes of the early modern "Silk Roads."

Keywords: archaeology of Afghanistan, early modern empires, caravan routes, remote sensing, GIS

Declaration of interest: NONE

1 Introduction: remote views on early modern Afghanistan

This paper presents significant new empirical data on the overland trade routes that connected Safavid Persia, Mughal Southeast Asia, and Central Asia through Afghanistan during the early modern period (16-17th century AD). In particular, we focus on caravanserais or road inns[1] built within the territory of the modern Republic of Afghanistan **(Figure 1).** Through Geographic Information Systems (GIS) synthesis of early modern and late 19th-early 20th century European travel accounts, and model-driven survey of an integrated set of remote imagery for Afghanistan, we have generated a network dataset of 81 standardized caravanserais (out of a total dataset of 149 buildings). These data demonstrate the intensive and extensive nature of investment in highway travel by early modern Islamic empires within the extensive frontier zones between Afghan cities. Specifically, the caravanserai network in Afghanistan

[1] For a discussion of the caravanserai in the broader context of the medieval and early modern Near East and Central Asia, see: Campbell 2011: 40-60; Franklin 2014a: 40-68; Hillenbrand 1994: 331-376; Cytryn-Silverman 2010; Sauvaget 1940, Siroux 1974: 349.

suggests that Safavid Persian investment in trade and travel in particular was more extensive than previously realized, and intersected or overlapped with Mughal strategies. Furthermore, the brick and mudbrick of this set of monumental caravanserais ground the itineraries of early modern European travel accounts within the material landscape of standardized imperial infrastructures. The span of this system of regularized buildings between India, Central Asia and Persia fills in an uncharted periphery within these historical accounts of early modern economy. Our data from Afghanistan show that, far from being disorganized, tenuous or insignificant, travel and trade through Afghanistan was supported, at least for a brief period, by an infrastructure sufficiently regularized as to produce a powerful presence in landscapes and territories outside of direct state control. We also explore the ways that the Safavid caravan infrastructure in Afghanistan has moved in and out of historic visibility, escaping historic notice except when it suited the shifting narrative purposes of writing travelers, provided evocative scenery for early modern artists **(Figure 2)**, or afforded tactical vantage to successor regimes. Our remotely sensed networks thus contribute to the early modern archaeology of infrastructure as spaces that contain and shape social interactions in persisting, though sometimes unpredictable, ways.

2 Remotely sensed archaeology in Afghanistan and the AHMP

The archaeological landscapes of Afghanistan are peerlessly rich, testifying to the geopolitical location of Afghanistan as a nexus of ancient empires, trade routes, and cultural phenomena. Unfortunately, the conditions of twentieth-century geopolitics have prevented extensive archaeological research in Afghanistan for multiple decades, essentially since the Soviet invasion in 1979 and subsequent decades of conflict in the region. Survey projects undertaken in the latter 20th century were stalled as investigators lost material data and opportunities for follow-up research due to shifting political situations (M. Allen personal communication, Ball and Gardin 1982: 20-21). The decade of civil war which spanned the Soviet retreat in 1989 and the US invasion in 2001 constricted access still further, while increasing threats to archaeological heritage from both lack of oversight and intentional,

performative acts of destruction by groups like the Taliban (Hammer et al. 2018; Feroozi 2004). The territory of Afghanistan has thus constituted a gap in attempts to synthesize archaeological phenomena across the broader region, from the Bronze Age to the early modern period (See for instance the gaps in regional maps in Hiebert 1994: 177; Kleiss 2001: 6). While localized archaeological projects have resumed in the last decade (Cf. Tarzi 2007; Besenval et al. 2010; Marquis 2013; Stein et al. 2017), the increasing use of remote methods (imagery and other data collected via satellite) in archaeology has enhanced our ability to quantify inaccessible landscapes in places like Afghanistan (see especially Thomas & Kidd 2017; Casana 2017; Danti 2015; Cunliffe 2013). The result is a country-wide view of archaeological remains both over time and in high resolution-- though many aspects of research still remain tantalizingly out of reach.

This research was undertaken under the framework of the Afghan Heritage Mapping Partnership (AHMP), a collaborative project between the Oriental Institute at the University of Chicago and research institutions in Afghanistan, and funded by institutional grants from the Department of State and the US Embassy in Kabul. The Partnership's aim is systematic recording of archaeological sites in Afghanistan and the creation of heritage management tools, as well as the training of Afghan professionals in the use of those tools. At the same time, we have unparalleled opportunities for countrywide research using the high-resolution imagery and other data made available to us by the US Department of Defense. The core of the AHMP's research methods is a program of remote discovery and systematization of archaeological site data for all regions of Afghanistan. We have covered multiple regions of the country (north and south of the Hindu Kush) with gridded, systematic landscape surveys using high-resolution satellite and aerial imagery (as well as historical maps and LiDAR), and integrated these high-density survey datasets with the country-wide data contained in the *Archaeological Gazetteer of Afghanistan* (Ball and Gardin 1982). In the course of digitizing extant datasets and carrying out remote systematic surveys throughout Afghanistan, we observed a remarkable distribution of nearly

identical ruined caravanserais (monumental caravan inns) (Franklin and Hammer 2018). Drawing on synthetic works and our own comparanda, we dated this set of standardized buildings to a period when the territories of Afghanistan were to varying extents under the control of the Safavid Persian and Mughal empires, the late 16th-mid 17th centuries (O'Kane 1987: 17-18; Ball and Gardin 1982; Kleiss 1999, 2001). As we will discuss, this initial discovery served as the basis for systematic research into Afghanistan's early modern route infrastructure using remote imagery in GIS.

It has become commonplace to refer to the territory of Afghanistan as a 'graveyard of empires,' referring to the long (and ongoing) history of imperial invasion and occupation, often at great cost (for a recent example see Nordland 2017). The term is tied to a longstanding imaginary of Afghanistan as a forbidding mountainous landscape that swallows armies, political aspirations and civilizing missions alike-- a conceptualization that archaeologists, historians and anthropologists have worked to debunk through research into long histories of exchange, interaction and mobility through the Afghan landscape. Our newly-compiled datasets of early modern transit architecture serve a dual use, shedding light on an understudied archaeological period in Afghanistan as well as presenting a new perspective on the so-called "gunpowder empires" of the Safavids and Mughals, and their role in the construction of modern world cultures. As we will explore in the sections below, a network mode of endowment, patronage and spatial production through the territory of Afghanistan demonstrates an approach to the challenges to control presented by the Afghan landscape, rooted in Central Asian traditions of power. More importantly, the caravan network testifies in material terms to the production of a landscape of travel in Afghanistan, thus constituting the conditions of possibility for long-distance mobility in the early modern period and for subsequent centuries.

3 Afghanistan and the Safavid Empire

In focusing on the role of infrastructural networks in shaping Afghan landscapes in the early modern period, we interrogate the nature of territorial politics on the part of empires like the Safavids and the Mughals, and the spatial realities of power in a place like Afghanistan. Infrastructural networks, like the systematic construction of monumental caravanserais, are a material strategy for producing legible and ordered spaces, and thus for tying together landscapes that were nominally or fleetingly under state control (in the modern sense of territorial rule). During the early modern period (AD 16th-18th c), as through much of the region's history, the geopolitical landscape of the region now called Afghanistan was shifting, fragmented, and nodal rather than an integrated whole **(Table 1)**. In the mid-16th century, the central territory of modern Afghanistan, occupied by a number of pastoral nomadic tribes including Ghilzai and Durrani Pashtuns, was nodally controlled from east and west by the Safavid and Mughal empires. These polities ruled the cities and plains via local tribal governors, and invested funds, labor and materials in maintaining the routes between (Barfield 2010: 93; Emerson and Floor 1987: 318). Thus Kabul was historically a Mughal node, while Herat and Farah were Safavid-controlled nodes. Some cities constituted disputed frontiers in this period: Balkh changed hands many times between the Safavids, Mughals and the Uzbek Khanate of Bukhara. Similarly, the city of Kandahar was a bone of contention between the Safavid and Mughal empires, and was conquered and re-conquered twelve times between the early 16th and early 18th centuries (Mathee 2008). The mountains and river valleys which separated cities remained very much the domain of pastoralist tribes. W. Floor has argued that this phenomenon led to coordination between the Safavids and Mughals to keep the roads secure, as both polities were invested in the movement of people and goods through Afghanistan (Floor 2012: 209-10; Ibid. 1999: 67-68 for a description of the patch-like construction of the Bandar 'Abbas route). The result was a weblike construction of infrastructure around cities and along routes, a footprint of state power over space that expanded, contracted and transformed over time as local patrons built new caravanserais, bridges and cisterns. Critically, this infrastructural network functioned both to establish a physical presence on the

frontier or margin of imperial reach, and to constitute that frontier, making more permeable the apparent boundaries between the Safavid and Mughal empires.

The rise to power of Safavid Shah Abbas I (r. 1588-1629) marks a turning point both in Safavid policy and also in the visibility of the workings of the Safavid empire to outsiders (Mathee 2012a: 10). Western history of the Safavids has long been entangled with western histories of travel, as impressions of Safavid statecraft, economy, and culture were contextualized by the experiences of early modern European travelers, and framed within the genre of the travel account, which exploded as an industry of entertainment and scientific observation at the same time. Drawing extensively on these accounts, historical narratives agree on the importance of trade to the policies of Abbas and his successors, both in terms of military strategy and domestic rulership. The history of Shah Abbas' rule is a list of tactical interventions in trade economy, from the construction of road and caravanserai systems to the systematic deportation and installation of the Julfa Armenians at Isfahan to serve as a captive mercantile network (Aslanian 2011; Babayan 2012). In 1622 Abbas conquered Kandahar from the Mughals, and took Hormuz from the Portuguese with the aid of the British East India Company, later establishing the port of Bandar Abbas on the opposite mainland (Streusand 2011: 153). The Safavids taxed internal and external trade, whether through duties at the border or road tolls in the interior (Floor 2012; Steensgaard 1999; Kerr 1824; Manrique et. al. 2010: 262-264). Caravanserais were built and leased to cover the so-called "table expenses" of the Shah, and could be loci for the collection of road duties as well as being taxed for their revenues (Mathee 1999: 68; citing Tavernier I: 446-8 and Chardin vii, 399-400; Emerson and Floor 1987: 318). During the same period, the Mughal rulers placed a similar state emphasis on trade: the Mughal emperor Jahāngīr (r. 1605-27) ordered the construction of wells and serais at regular intervals throughout his territory (Begley 1983: 168). Caravanserais in both the Mughal and Safavid contexts served as loci for pious charity towards poor travelers, and hospitality towards noble guests (Campbell 2011: 55, 65). The attention paid to trade and especially to overland trade

infrastructures (roads, bridges and caravanserais) has contributed to the categorization of the Safavid empire as a 'transit economy,' defined as a channel through which goods passed rather than the origin of goods or materials, silk being the exception (Floor 2000: 28). As Mathee explained, the roads and ports of Safavid Persia straddled the distance between consumption in Europe and production in India; he cited early modern traders who complained of Safavid Persia having "little trade in itself" (Sainsbury 1964: 199, cited in Mathee 2012b: 34). Caravanserai buildings across Iran are thus taken as monuments to the duration and efficacy of this economy, rather than necessarily a mechanism by which trade economy was made possible, and power made visible in the landscape. However, we want to take a critical look at the way that the historical framing of Safavid 'transit economy' precludes some opportunities for thinking about the long-term social effects of infrastructure, beyond the success or failure of temporally limited economic strategies.

4 The Safavid 'transit economy' vs. infrastructures as political spaces

Within a formulaically conceived 'transit economy,' caravanserais as state institutions exist to extract value from travelers, who are motivated as rational actors to choose less costly routes (Campbell 2011: 55, 65). According to this model, a Safavid caravan system is thus an imperial apparatus imposed upon an extant reality of freely wandering merchants moving across Central Asia. While it is true that human mobility occurs prior to and outside the purview of empires, this model also discounts the role of infrastructures like caravanserais in creating new conditions of possibility for movement, new cultures of travel. The contradiction in this approach to Safavid economy (and indeed those of other "gunpowder empires" like the Mughals and Ottomans) is rooted in a deep orientalism, or the framing of Asian economy from a perspective centered in the history of the European trade companies. This bias manifests in the historical project of "the fall of the overland routes" as formulated within the disproved-yet-persistent 'Steensgaard thesis' (Steensgaard 1973, countered by Mathee 2012b: 35).

Within this conceptualization, in displacing overland with maritime trade the Dutch and English East India companies did not so much replace a predecessor system as eliminate an archaic and premodern remnant, a "transit trade of pedlars" as opposed to a rational and market-savvy institutional complex of a modern capitalist order (Steensgaard 1973: 11).[2] Steensgaard's opposition between the overland 'pedlar trade' and the institutionalized trade of the Companies was teleological: one is pre-modern, the other imminently modern. Despite progressive reconceptualization of the role of Persian overland trade routes in the early modern economy, the imaginary of an informal and itinerant system of merchants still obscures the social significance of these route networks in shaping landscapes of movement (Hopkins 2008: 113).

Also critically, Steensgaard and others reduced the entirety of 17th-century trade through Afghanistan to the discussion of a single route, that connecting Lahore with Bandar 'Abbas and Isfahan through Kandahar (Steensgaard 1999). These assessments of the quality of that route and volume of travel along it are based on European travel accounts, which neglect to describe caravanserais specifically within Afghanistan (though they do describe fortified stations, as we discuss below).[3] The lack of description of travel infrastructure is jarringly juxtaposed with accounts of the number of people and animals moving along the same route. The early 17th c travelers Steel and Crowther claimed that 12-14,000 camels passed through per year; the traveler Thomas Coryat, also traveling in 1615, described joining a caravan of more than 5000 animals and six thousand people (cited in Foster 1921: 260). Even in the single case of the Kandahar-Farah route, the historical narrative according to which sea travel was preferred to overland caravans is complicated by the multiple accounts of European travelers opting to move themselves and their goods overland through Afghanistan (Steensgaard 1999: 72-3).

[2] Steensgaard's thesis is based on an opposition between modern market capitalism and the "Asian pedlar economy" as formulated by van Leur based primarily on indirect accounts of caravan travel left by VOC observers. Exclusively western evidence is enough to categorize the Middle Eastern caravan trade as "a prosperous trade plied by small people--a trade carried on by pedlars, buying and selling in small quantities on continuous travels from market to market." (1973: 28).

[3] W. Floor and N. Steensgaard both relied heavily on a single account, that of Steel and Crowther (1615-21).

How can we juxtapose western observers' emphasis on the centrality of trade and trade infrastructure to Safavid governmentality with economic historians' dismissal of the significance of the Safavid "contribution to worldwide economic activities [as] relatively slight"? (Mathee 2012b: 31). Looking at caravanserais archaeologically, as built institutions with longer traditions and also with lasting physical legacies, helps to challenge the (orientalist) dualisms above, and to complicate the widely accepted narrative of early modern political power in Afghanistan. By taking an archaeological focus on the caravanserais themselves and where they were constructed at considerable cost, we can consider not only how caravanserais enabled empires to canalize profitable trade, but also how the Safavids and Mughals actually created the spaces that made trade and other forms of travel possible in Central Asia. In this project we are therefore contributing a material dataset to a deeper consideration of an early modern culture of trade, and of the ways that this trade culture shaped what are considered to be modern ways of doing commerce in and with Asia. Within early modern Persian culture, travel was central not only to the procurement and spread of exotic wealth, but also to the transformation and realization of the self (Babayan 2012). The institution of pious hospitality but also the built space of the caravanserai formed part of Safavid political cosmologies, as it played a role in broader Central Asian and Islamic ways of thinking about sovereign obligation and the relationships between worldly and otherworldly power. A great example of the link between Safavid (and Central Asian generally) politics and the spacetimes of travel is the dedicatory inscription of Shah Abbas above the entrance to the caravanserai at Kashan, which read: "The world is a caravanserai and we are the caravan. Do not raise a caravanserai within a caravanserai" (Chardin 1811; III: 3). The inscription invokes both the transitory nature of mortal power and, paradoxically, the durability of the caravan itself as a microcosm (see Franklin 2014 for more discussion). This microcosmic approach to the caravanserai was taken in the Mughal empire as well, where a broader epigraphic tradition linked the construction of caravanserais "as wide as the heavens" to the will and memory of a royal or princely patron (Campbell 2011: 65;

Cunningham 1882: 64). These ways of thinking carried through the early modern period, just as the buildings themselves survived and continued to shape spatial life in Persia and Afghanistan; discussing early 19th century travel narratives, Kia explored the long-lived ties between autobiography and Persian travel writing, and also the use of travel as a frame to explore mystical and sacred landscapes within which the narrator is thus situated (Kia 2013: 45). In Afghanistan this ethic of royal hospitality situated within the inn is illustrated by the monumental caravanserai built at the western end of the Bagh-e Babur garden in Kabul. According to an account in the *Padshahnamah,* the Mughal Shah Jahan constructed this inn for the poor to "eat their food in those cells sheltered from the hardships of snow and rain" (Nanda and Leslie 2007: 39). The aim of our infrastructural archaeology is to materialize the "transit economy" in the spaces that were produced to house travelers, and explore the caravanserai as a way by which the Safavids and Mughals created a landscape of movement in Afghanistan.

4.1 *Archaeologies of Infrastructure: a brief background*

Within the last decade, historical anthropological and archaeological investigations of infrastructure have framed the built systems, spaces and support networks of political communities as active agents in the production, transformation and sometimes rupture of those communities. Critical anthropologies of technology have brought infrastructure-- electric grids, sewers, highways, airport systems-- into the realm of culture, and constituted these systems as inseparable from the bodies politic that they support, transport, or sustain (Cf. Bennett 2009, Latour 1999). In a recent review of anthropological approaches, Larkin stressed the double contingency of infrastructures. As material constructions, they transform over time in terms of the symbolic meanings attached to them and the affordances they provide; as systems, they slip in and out of view as things perceived as matters of concern, or as issues of politics (Larkin 2013). Like the modern state infrastructures they predate, early modern caravanserai networks represent an armature of moral behavior, economic power, political performance, and cosmogenic

productions of socialized spaces and persons. The temporality of this armature is complex: the social institutions that maintain infrastructures may (and frequently do) fail, leaving the built components of infrastructural systems to signify in news ways. Caravanserai networks are an interesting challenge to heritage archaeology because their ruins can become naturalized within the highway landscapes they help to constitute,[4] and are interesting players in histories of trade and travel because, when they function correctly, they may fade from historical view. As we will discuss further below, taking an archaeological approach to infrastructure realigns historical perspective on caravan trade as an economic practice, on caravan routes as cultural spaces, and on 'transit economies' like that of the Safavids as passive or active participants in the construction of lasting global cultures. Also critically to an archaeology of the early modern period, infrastructure both challenges the direct mapping of nation states onto territories, and also provides a way to think about spaces of authority along shifting frontiers.

5 Methodology

We have used satellite imagery, historical maps and route modeling to reconstruct major sections of the Safavid-era (early-mid 17th c) travel networks connecting the cities of Iran with Central Asia and Mughal South Asia. As noted above, this project emerged from an observation by K. Franklin during systematization of geospatial data on archaeological sites for the Republic of Afghanistan. After noting a fragmentary spatial pattern of nearly identical ruined caravanserais, spaced 20-25 km apart along roads connecting Herat to Kandahar via Farah, and from Kandahar towards Kabul and Lahore, we designed a model to test the extent of this network and its relationship to historically recorded itineraries from the early modern period **(Figure 3)**. To build and inform the model, we consulted early modern maps and

[4] Building from Carse (2012) and Mitchell (2002), we would argue that one of the effects of landscape-scale networked infrastructures is to blur the line between nature and culture, such that part of the invisibility of infrastructure is a perception of human systems as nature, and vice versa.

traveler's accounts to examine the routes by which cities in that period were connected. From these combined sources, we generated linear route models: for the initial trial, we chose to examine the routes between the early modern cities of Herat, Balkh, Kabul, Kandahar, and Farah. Within the routes plotted, we used tools in ArcMap to generate points at predicted station distances, using a distance of 20 kilometers for the spacing between individual caravanserais on the routes based on the observed distance between known caravanserais and on ethnographic accounts of how much distance can be covered in a day's travel by a camel caravan.[5] We surveyed these targeted areas using differentially dated satellite imagery (including the ESRI basemap) and high resolution Buckeye aerial imagery, and Corona spy satellite imagery from the 1960s, as well as the 1:50,000 scale series of Soviet survey maps of Afghanistan, produced between 1983 and 1987 (Franklin and Hammer 2018). The differential dating of our imagery sources was essential, as some of these structures are not visible in recent satellite imagery. For example, the caravanserai at Tirpul (Gazetteer ID 1196), located south of Herat, has been completely demolished and is visible only in Corona imagery from 1967 **(Figure 4)**. As a follow-up to this methodology, we used the National Geospatial Intelligence Agency (NGA) place names server (http://geonames.nga.mil/namesgaz/) to systematically check places with the name *Saray* or *Rabat*, Persian and Arabic toponym components often linked to caravanserais. Interestingly, a good number of our caravanserais could be confirmed with the 'saray' designation, further suggesting a possible Persian origin for those place names. Due to the standardized nature of the caravanserai system, this method of targeted survey was extremely effective, and we were able to locate 149 caravanserais, 81 of which conformed to the standardized plan and orientation we had originally observed **(Figure 5)**. The model was demonstrated to be successful in guiding the remote discovery of caravanserai sites. Of the 95 caravanserais located along the route models (as opposed to caravanserais recorded during AHMP

[5] O.Lattimore set the average distance covered by a camel caravan at between 16-40 km per day, depending on terrain (Lattimore 1928:50-51). More pertinently, our distance of 20km is equivalent to approximately 4 parasangs, units of Persian itinerant distance.

research in other areas), six buildings (6.3 %) were found within 1km of a model point; 51 caravanserais (53.7%) were found within a 5km radius of the model point. In assessing these figures, it is also necessary to consider that the model did not compensate for changes in elevation; further modeling and testing of caravanserai locations will incorporate slope as well as distance.

6 Results: the caravanserais and the Afghan caravan network

The caravanserai dataset resulting from the route modelling survey is significant at multiple scales. First, we have compiled a set of standardized architectural structures in various degrees of preservation, from which we are able to reconstruct the standard plan used to construct caravanserais at intervals along Afghanistan highways **(Figure 6)**. Our dataset of 149 caravanserais contains a variety of building types which are identifiable as caravanserais with varying degrees of certitude, based on their attributes: they are monumental structures with cellular rooms arranged around a central court, and one or two gated entrances. This variable set of 68 non-standardized buildings includes structures from various periods, including, for instance, the Timurid-period Khush Rabat, located north of Herat. The set also contains buildings of varying plans, dating to the Safavid period, such as Islam Q'ala (Gazetteer ID 454). Some represent damaged or ambiguous structures that were identified as "candidate caravanserais," which may only be confirmed with further research or on-the-ground verification. Some of these are mentioned in travel accounts, such as the baked brick caravanserai outside the walls of Q'ala-i Fath (Gazetteer ID 842) **(Figure 7) (**Adamec 1972: 137-8; Ball and Gardin 1982: 206). These also include modern structures which may have been built on the ruined foundations of standardized Safavid caravanserais, and which follow their plan and orientation.

The major stages of the Afghan caravanserai system are made up of strictly standardized buildings, with similar layouts, dimensions, and orientations **(Figure 8).** This set of 81 buildings form the

center of our analysis and the core of our arguments about the nature of early modern investment in travel through Afghanistan. A standardized caravanserai from this set is consistently square, with rounded towers on all four corners. The exteriors are plain on three sides, with a single monumental and chambered *iwan* entrance, most frequently on the eastern side. The interior of the caravanserai is a spacious court, which is accessible on all sides through arched doorways by a double arcade running the length of three sides. These arcades would have been divided by their low arches into a series of bays. Based on the abstracted layout of gate, court, and division, we informally dubbed the standardized type of caravanserai the "E type" based on its resemblance to the capital letter. The dimensions of the E-type cluster unimodally around 100 meters on a side (measured from the center points of towers),[6] they would have been able to house large numbers of travelers. Seventeenth-century accounts of comparable Mughal caravanserais reported that they could accommodate up to a thousand people, as well as their animals and baggage (Begley 1983: 168). While some caravanserais are associated with possible external structures (e.g. Rabatmil), these are not standardized or datable as yet. Within the courtyard, 66 (78%) of the E-type caravanserais feature an internal structure (a square building divided by arcades into nine domed chambers) and a non-identical set of 66 also contain a dividing arcade running parallel to the axis of the iwan gate.[7] This arcade divides the court into two roughly equal sections, and is open near the gate.

Within ArcMap, we systematically calculated the orientation angles of the rear walls of both the internal structures and larger caravanserai structures to quantify the differential spread of internal structure orientation and caravanserai orientation. Overall the orientation of the caravanserais is remarkably consistent: 72 (88.9%) of the E type caravanserais open to the east; of those remaining, 2 were indeterminate and 6 (7.4%) were west-facing. The west facing caravanserais are spatially

[6] Breadth of caravanserais ranges from 75-145m; there are few outliers within this range, however. 72 caravanserai (88.9%) are within 90-110m width range,) and 62 (76.5%) are within the 95-105m range.

[7] In other words, not all caravanserais with one internal feature also have the other. Also, 78% is a conservative number in both cases, given that these internal structures are often destroyed through reoccupation of the caravanserai.

clustered: five of them are in Kandahar province and are linearly associated (Kishkinakhud, Alakadari Daman, Hushab, Seyid-Mukhammed-Kalay, and Gaysh-Rabat). A further single west-oriented building was found in Herat (Alikarcha). We are still researching possible explanation for this apparently non-random change in orientation. Interestingly, we found that even when the orientation of the caravanserai shifts slightly to align to the features in its surrounding landscape such as roads and topography, or is reversed altogether, the internal structures remain consistently oriented along an east-west axis. This evidence for conscientious orientation of the inner structures with their back wall toward the west, as well as their structural similarity to contemporary Mughal examples from the Agra-Lahore trunk road (including evidence for a central niche to the west), suggest that these buildings may have originally been mosques (Begley 1983). Though more refined investigation of these patterns will require on-the-ground examination, nonetheless the similarity of caravanserai plans and features across apparent (though shifting) political boundaries demonstrates the role of the overland trading system and its infrastructure as a spatial culture that cut across the geopolitical oppositions between empires.

The second, scalar result of this study is that we have reconstructed the routes of travel by examining these standardized caravanserais as a system, distributed across Afghanistan **(Figure 5).** The immediate implication of the route-scale dataset is a demonstration that early modern routes connected all of the major Afghan cities, rather than the single Kandahar-Farah-Isfahan route which predominates in discussions of overland trade. From our remote view we cannot speculate as to the individual patronage of these structures; however, the standardization of building form and stage length implies some degree of centralized planning, even if construction was undertaken locally. So far, we have reconstructed significant sections of caravanserai routes: between Herat and Merv, Herat and Farah, Farah-Kandahar, Kabul-Kandahar, and Kabul-Balkh. Outside these linear arrangements, we also have an incomplete set of caravanserais of varying forms along routes north from Kabul and southwest

from Farah.[8] By correlating the construction of these systems with the historical use of these routes and stations, we can further establish the relative chronology of the infrastructural network.

7 Dating the Afghan network

Data at both the scale of the building type and of the routes themselves means that we could work at multiple scales to date this caravanserai system to the early modern period, and specifically to the earlier part of the 17th century. This requires engaging with multiple strands of evidence, including the accounts of early modern and modern travelers who passed through Afghanistan **(Figure 9)**. As we will discuss below, the notice given by these travelers to caravanserais during their journeys through Iran and Central Asia reveals several things about the nature of travel accounts as evidence, and the capacity of caravanserai infrastructures to disassemble, transform and be differentially visible within landscape. At the level of the individual structure, we compared the plan of our E-type caravanserais with dated examples from Iran, such as the early 17th century Safavid caravanserai at Izadkhast **(Figure 10) (**Kleiss 1999: 53; the Safavid structure at Murčeh Khort is also a comparandum: Kleiss 1999; III:50). We also have epigraphic evidence from some of our caravanserais dating this form to the early 17th century. Major C.E. Yate, travelling with the Afghan Boundary Commission (ABC) in 1885-6, passed by the caravanserai (and nearby early Islamic mound) at Kafir Qal'a (Islam Qal'a) (Gazetteer ID 454) (Yate 1888: 55; see also Ball and Gardin 1982: 130). Yate described the glazed pottery lying on the ground across the site and the marble dedication slab above the doorway of the "robat," giving its date of dedication as A.H.1037/AD 1628. In addition to tracking the reporting of specific dates, we used travelers' descriptions

[8] Our research on possible caravanserai buildings and routes through Sistan especially was constrained by data factors, specifically the overall low resolution of the ESRI basemap and lack of high-resolution satellite or aerial imagery for this region. In general, the work of the AHMP on Sistan (in collaboration with M. Allen and W. Trousdale) has demonstrated a critical lacuna in the overlap of ongoing military and sustained archaeological interest in Afghan landscapes.

to establish relative chronology for the caravanserai network. This means systematically tracking the date of travel of different authors, and correlating their descriptions of caravanserais at named stations as in use, ruined or rebuilt (see Table 2). Critically, the caravanserais in our Afghan network are described as ruined by travelers writing in the first half of the 19th century. In his account of his 1845-1854 travels, J.P. Ferrier noted the "dilapidated" state of the caravanserai between Herat and Shabith, which he is told was built by Shah Abbas (Ferrier 1856: 263).[9] Arthur Campbell Yate, writing for the ABC in 1887, described the ruined E-type caravanserai at Tirpul (Gazetteer ID 1196) **(Figure 4)**, south of Herat:

> Tirpul is one of the most striking bits of scenery we have come across, with its huge rambling tumble-down caravanserai (Rabat-i Tirpul), with great domed chambers and courtyards half choked with heaps of brick and mortar; its bridge of five or six arches, built of burnt bricks a foot square, resting on pillars of stone work, and paved with broad stone slabs...(Yate 1887: 149)

Though by the late 19th century, the structures in our network are described as ruined, the infrastructural landscape connecting cities continued to inform movement and governmentality in Afghanistan. According to Ferrier's travel account, Safavid caravanserais south of Herat were rebuilt selectively both by the British and by the 19th century Afghan government (Ferrier 1856: 263 footnote). Kakar described the efforts of the Emir 'Abd al-Rahman khan to rebuild caravanserais starting in 1892 (almost a decade after the observations made by the ABC). The reconstruction efforts of the modern Emirs were effective enough that they overwrote the folk-historical attribution of many caravanserais in Afghanistan, even to the point where members of the 1935 German Hindu Kush Expedition mis-attributed Timurid structures such as the 15th century Khush Rabat to the 20th century Emir Habibullah Khan (Scheibe, Teil 8: DHE 254-307, Rückreise durch Nord-Afghanistan, from https://www.phototheca-afghanica.ch; see also Pugachenkova 1946: 45-49). In contrast to these descriptions of ruins in the 19th century, travelers in the mid-to-late 17th century described or drew caravanserais similar to our E-types

[9] Numerous authors note that caravanserais across Iran were apocryphally or anecdotally attributed to Shah Abbas. We take this into account; the particular attribution to an individual ruler is less significant than dating relative to periods of infrastructural investment in Afghanistan.

in active, occupied conditions. Jean Baptiste Tavernier described the square, single-entrance courtyards of Persian road-inns together with the amenities available inside:

> "They are built square, much like Cloisters, being usually but one story high; for it is rare to see one of two stories. A wide gate brings you into the court; and in the midst of the building, in the front, and upon the right and left hand, there is a hall for persons of the best quality to keep together. On each side of the hall are lodgings for every man by himself. These lodgings are raised all along the court two or three steps high, just behind which are the stables..." (Tavernier 1678:45).

The traveler Jean Chardin provided an illustration of the Safavid caravanserai at Izadkhast in the 1670s **(Figure 10)**; this structure is a formal comparandum for our E-type (Kleiss 1999: 54). Traveling westward from Kandahar in July of 1615 (a few years before that city once again was regained by the Safavids), Richard Steel and John Crowther noted the E-type caravanserai at what is now called Kishkinakhud: "*Cashecunna,* a small castle in which the Mogul has a garrison, being the utmost boundary of his dominions westwards" (Cited in Kerr 1813: 213). As we will discuss in the next section, we can use these historical travel accounts to corroborate the Afghan caravanserai network at the scale of routes used in the early modern period. However, we have frustratingly few mentions of the Afghanistan caravanserai buildings themselves left by these early modern European travelers, or of what it was like to stay in them—though these travelers wrote much about Safavid and Mughal caravanserais more generally (Floor 1999, 2012). Returning to our goals laid out at the beginning of this paper, we will explore how our archaeological datasets (the physical landscape of the caravanserais themselves) can problematize the straightforward reading of negative evidence in the historical record as, in fact, indication of the lack of infrastructural complexity of the early modern road systems in Afghanistan.

7.1 *Travel infrastructure in Afghanistan and early modern travelers: problems of historical evidence*

If, as discussed in previous sections, caravanserais have been historically used as an index of state intervention in long distance trade, then our discovery of systematically constructed routes of caravanserais connecting the cities of Afghanistan to both Iran and the Indian subcontinent materially

demonstrates Safavid (and Mughal) production of infrastructural landscape in Afghanistan in the early 17th century. Beyond the manifestation of spatial politics however, this analysis takes an anthropological approach to the question of travel infrastructure, and looks more critically at caravanserai networks as a project of power. In this section, we will explore the apparent contradiction between a western historical perception of Afghanistan as a frontier crisscrossed by 'pedlars,' and the robust infrastructure represented by our archaeological results. Our data suggest a greater investment in travel routes through the territory of the modern Republic of Afghanistan, during a period when it is considered a frontier or liminal area. The river roads and mountain passes of Afghanistan were crucial as an overland connection between Persia and India, Central Asia and China. Prior to our study, these routes were almost exclusively known from the accounts of western travelers, dating from the 17th to early 20th centuries. This is not to say that there are no non-European sources on travel for this period; as we discussed above, the cities and landscapes of Central and South Asia were traversed by a range of travelers from the 'gunpowder empires' and elsewhere. Some of these travelers mention caravanserais; for instance, Mahmud Balkhi (traveled ca. 1630) described in passing the architecture of the Mughal caravanserai at Ghor Khatri (Balkhi 1980: 4-6; cited in Alam and Subrahmanyam 2007: 135). Nonetheless, as Alam and Subrahmanyam (2007:4-5) point out, accounts of travel and encounter written by non-western authors have only recently been approached by western historians as 'reliable' accounts of social geography rather than as literary confection. This oversight was compounded in economic histories of early modern trade by a lack of, or disregard for, archaeological data pertaining to the physical infrastructure of routes. As we will now explore, in the absence of archaeological data the historical assessment of early modern infrastructure in Afghanistan has been dependent upon the notice given to the caravanserai system in these European travel accounts.

The wealth of discussion of overland trade and the number of published accounts of European travel between Persia and India through Afghanistan contrasts with the lack of textual data on the

material infrastructure of the routes themselves. For example, Floor documented the historical significance of routes through Afghanistan for trade. However, he remarked with surprise that the Safavids did not apparently do more to maintain and sustain these routes in the eastern edges of the empire: "Despite the fact that the road was much traveled by pilgrims, not just by traders, it is amazing that it was not a well serviced one. There were hardly any caravanserais such as those that dotted the other major commercial routes in Iran" (Floor 2012: 230). Similarly, Kleiss, who compiled an exhaustive architectural gazetteer of caravanserais and related structures in Iran and neighboring regions, is reliant solely on 19th century documentary evidence for the tracing of caravan routes through Afghanistan (Kleiss 2001: 89). We therefore present our remotely discovered caravanserai system as an initial intervention in the trend of reconstructing Afghanistan's early modern trade infrastructure based almost exclusively on the accounts of western travelers. At the same time, we also want to use this intervention as an opportunity for critical historiography of early modern travel accounts written by Europeans, and specifically a critique of these accounts' presumed objectivity-- or perhaps, as a foregrounding of their idiosyncrasy. Steensgaard pointed out that from the time of Shah Abbas onward western travelers in Persia primarily noted the infrastructural system, not as the presence of institutions, but as an absence of bandits in the interior of the country (Steensgaard 1974: 68). Floor demonstrated that European travelers would describe caravanserais along frequently traveled routes often when they were either very commodious or remarkably unpleasant (Floor 1999). We are interested in the way that the nature of historical evidence shapes the reconstructions that are possible to create from that evidence. In particular, how might generic aspects of writing by Europeans traveling through Afghanistan, or the embodied experience of travel itself, have structured our historic perception of Safavid infrastructures? As we juxtapose our archaeological data with historical accounts and attempt to reconcile the two datasets we ask, *when, and why, did western travelers 'notice' caravanserais in their writing?*

7.2 *Exceptional subjects: European travelers and travel accounts as a genre*

Our textual accounts of travel in Afghanistan were written over several centuries for a variety of stated purposes, from entertainment, to education, to strategic research. Yet there are also broad similarities which link these accounts: they were written almost exclusively by European men, traveling in the interest of merchant companies or state governments or both. This is a key aspect of the record that is often elided from historical analysis, where early modern European accounts in particular are tacitly used as a representation of all "travellers" from that period (e.g. Floor 1999). These writing travelers were aristocratic, and they wrote for an aristocratic audience. In the advice they include for their European readers, these writers reveal that they are not the typical embodied subject traveling on the Afghanistan highways, but nonetheless presume a degree of cosmopolitan hypermobility shared between themselves and their readers. They consistently provide tips for how to attain a sufficiently versatile presentation of 'traveler self' through various modes of disguise. Sebastian Manrique, a Portuguese missionary traveling through southern Afghanistan in 1642, described the ideal disguise as that of a merchant:

> On making this arrangement [for travel to Kandahar] all considered that if I went as a Sodagor or Merchant it would be easier to procure me a free passage, such as other merchants obtained. They considered that with this object it was essential to purchase at least two thousand rupees' worth of the usual wares and load them on two camels, which, when they were sent off, would bear my false name and my nation in the formon,[10] as was usual. By taking this precaution he would be able to pass my formon through easily with his other formons and papers (Manrique et al. 2010: 248).

Tavernier for his part advised on the clothes to wear to fit in across Asia, and on the different ways to trim one's beard, saying generally "When you go from Constantinople, Smyrna, or Aleppo with the caravan, it behooves all people to carry themselves according to the mode of the country" (Tavernier

[10] A passport or permit issued by a local governor.

1678: 47). Ferrier argued as well for suiting one's appearance to the country one travelled through, and in general observed the disadvantage of clearly appearing as what he was-- a European.[11]

These descriptions of disguise are an excellent, if sometimes bizarre, indirect insight into the typical types of (male) traveler present on the highway-- and they demonstrate the singularity of the subjects who have left us written descriptions of road travel. They also remind us of the simple fact that these travelers *had bodies,* which experienced discomfort and hunger as well as pleasure and rest while traveling. These early modern travel accounts have provided the framework and primary evidence for historical knowledge of trade through Afghanistan in the early modern period. Our ability to imagine the overland economy at that time has therefore been shaped by the embodied experience and situated perspectives of these traveling men, and we are subject to their idiosyncrasies of perception and memory.[12] As we undertook an archaeological reconstruction of the trade routes through Afghanistan based on material evidence, we thus found ourselves corroborating but also challenging this historical corpus. Critically, we must reassert the historiographical fact that early modern travel accounts are both a source of historical information but also a literary genre that has shaped scholarship. This is illustrated by the concern that many travelers have for the style as well as the content of their accounts (Moorcroft et al. 1841: iiv). Apparently, it was not a priority for these writers to supply description of the routine lodgings provided along the route, unless perhaps to remark on the high fees paid per camel. As Floor has shown, disgruntled European travelers on the Isfahan-Bandar 'Abbas road complained about the filth and disarray of caravanserais and cisterns that had fallen into disrepair due to negligence and/or the lapsing of their institutional support (Floor 1999: 68). These observations fit a more general pattern by which Europeans critiqued the excesses of Safavid 'oriental despotism,' even while admiring the

[11] Ferrier 1856: 9. "Our European clothes tight in bad taste and as an Oriental considers them indecent if they have by chance the merit of procuring a certain consideration on the part of Persian functionaries do most decidedly attract the insults of the children and lower orders and make the wearer a mark for every kind of extortion."

[12] Steensgaard offers a bemusing argument in defense of the use of these sources as exclusive evidence: "Unfortunately the surviving documentation so far only concerns Europeans whose numbers on the route were relatively insignificant, but we have no reason to believe that the infrastructural routines of the Indian, Turkish, Persian and Armenian merchants would have been fundamentally different (1999: 64).

broader landscapes of Persia (Mathee 2012a: 15). Changing geopolitical priorities, but perhaps also the 19th c travelers' concern with narrative style, might explain why we have many more physical descriptions of Safavid caravanserais in Afghanistan in the 19th century, when the buildings are ruined, than during the brief period in the 17th century when the road inns would have been functional. Travelers through Persia and Afghanistan in the 19th century-- such as the officers of the Afghan Boundary Commission or Robert Ker Porter-- indulged in romantic descriptions of ruins which they frequently followed with musings on the setting of the star of Persia, and the rise of European economic and civilizational power.[13] Our data demonstrate that caravanserai infrastructure in Afghanistan was, nonetheless, a robust physical reality—and one that extended past the briefer time span of the institutions that maintained it.

8 Discussion

Using remote methods and the integrative capacities of GIS, we have compiled material evidence both on the extent of the infrastructural landscape produced during the early modern period, but also details about the spaces afforded to travelers. Innumerable details about these caravanserais remain to be studied on the ground, including myriad architectural aspects and possible epigraphic data indicating the identity of their patron builders. Yet through our remote imagery we can see the arched galleries, monumental chambers, and secure courtyards that would have kept traveling humans, as well as their animals and material goods, safe overnight in the 17th century. Our data require a shift in conceptualization of the Afghan landscape, abandoning the 'graveyard of empires' model for the early modern period and emphasizing instead the immense efforts by empires to house and sustain commerce; the other label frequently applied to Afghanistan, that of "crossroads of Asia," is clearly

[13] Describing the caravanserai ruin at Gulran: "Underlying the vegetation that has now overgrown this little-used track, may be detected the indications of a once much-frequented trade route…. The ruined *serais* which we now see on the road from Herat to Mashhad date, I believe, from the reign of Shah Abbas. They are but crumbling ruins now, whereas the one here has not one brick left standing on the other…" (Yate 1887:285); Ker Porter states the purpose of his journey through Persia as to "compare men as they are, with what they have been, and the recent progress of Asiatic regeneration, with the full growth of civilization as it is displayed in Christian Europe" (1821 I:2).

more appropriate. Expanding our scale of analysis beyond the galleries of each endowed caravanserai, this dataset demonstrates how the caravanserai system worked as infrastructure to tie together early modern Afghanistan as a network of legible transit landscapes, traversable by travelers. The extent of the networks in Afghanistan, consisting of 100 m-square structures at 20 km intervals along routes spanning hundreds of kilometers—suggest the importance of travel through Afghanistan to both Safavid and Mughal political economy.

We conceive of the Afghan caravanserai system as a set of *infrastructural landscapes,* products of investment in the mobility, comfort and connectivity of subjects (humans/nonhumans) in the care of the Safavid and Mughal empires. Thinking critically about the vast caravanserai network as infrastructure helps both to conceptualize its role in Safavid governmentality (and in early modern politics more generally), and also to explain how the caravanserais can shift in their visibility and valence across historical periods and source texts. Infrastructural landscapes persist and continue to shape the experiences of people through time, but their perceived significance and attached meanings are not stable-- especially as infrastructures break down, are rebuilt, and fall to ruins again. Our synthesized data on the Afghan networks suggest that they represent a palimpsest of routes and stopping places from multiple periods, with the caravanserais of one period built alongside, on top of, or from the ruins of another. Siroux described the Safavid practice of modifying earlier Seljuk and Mongol caravanserais elsewhere in the empire (Siroux 1974: 351); certainly the Afghan early modern networks overlap with Timurid and earlier routes. We have already discussed the observation of ruined caravanserais by 19th century travelers, as well as the ways that a ruined caravanserai served as a signifier of an entire romantic oriental landscape of travel and trade (much as they continue to signify to Silk Road tourists today). Yet Tavernier and other travelers described using ruined caravanserais as campsites, demonstrating that even when the services associated with the institution of the inn were discontinued, the physical building still served the infrastructural functions of shelter and stopping place.

Remotely-sensed landscapes also present challenges to historical interpretation, especially regarding questions of temporality. As Franklin and Hammer discussed, the landscapes made accessible through satellite and aerial images are collapsed temporally into palimpsests of construction, use, decay, and reuse (Franklin and Hammer 2018: 66-68). This makes it difficult to date structures absolutely or to assess how long they were in use; likewise, it means that we cannot know if all of the structures in a network were extant at the same time. Until more data are available, we are reliant on archaeological methodologies, essentially creating an 'artifact type' from the distinctive form of the E-type caravanserai. In addition to these material inferences, we are dependent on the 'eyes on the ground' provided by early modern, European travelers. As we have explored, both of these information sources are incomplete, and situated in the particular modalities of their recording—whether the modern reality of remote sensing, or the embodied perceptions and generic representations of early modern western writers. While on the one hand presenting a further challenge to the absolute dating of these structures 'from space,' this palimpsest quality of caravan infrastructure points to the dynamic ways in which human movements and travel landscapes co-constructed each other over the long term in Central Asia.

As physical infrastructure, the Afghan caravanserai network bears a particular relation to the Safavid and Mughal institutions of hospitality and control that articulated within it. Thus, the caravanserais and the route landscape they constitute continued to exist in a ruined state long after the contraction of institutional support, and continued to shape movement through Afghanistan. As Hopkins observed, "not until the last quarter of the eighteenth century did the short-distance caravan trade patterns surviving the earlier breakdown of regional trade patterns succumb to the pressures of political instability, changing consumer tastes, and competition from European colonial powers" (Hopkins 2008: 111). Byron, writing of his travels through Iran and Afghanistan in the 1930s, observed the role of Safavid caravanserais in shaping perceptions of transit space: "Robat is the Afghan term for

caravanserai, and is also used as a measure of distance, since the main highways have these establishments every four farsakhs or sixteen miles [approximately 26 km]" (Byron 1982: 229). In our imagery from the last decade we have evidence for the continuing renovation and reuse of caravanserais. Frequently, houses are built within their frames; this is observable in both Afghanistan and Pakistan. The caravanserai at Kishkinakout, which was described by Steel and Crowther as a Mughal military outpost on the Kandahar-Farah road, was incorporated into Forward Operating Base Maiwand. Satellite imagery shows the use of the caravanserai to house personnel and equipment, thus demonstrating the ongoing role played by caravanserais in state strategies of territorial control (ESRI Basemap satellite image dated August 25, 2013). We also have evidence, as in 2013 Buckeye imagery from Khushkava in Farah, for the continuing use of Safavid caravanserais as stations within the circuits of mobile pastoralists **(Figure 6)**. Our imagery thus shows how the material investment of empires like the Safavids provides for the comfort of mobile humans and animals even today.

The relationship between caravan trade and nomadic pastoralism is one of the large questions left for future work. The infrastructural landscape of caravan inns would have overlapped with the landscapes of pastoral movement through and across the Safavid-Mughal borderlands. Barfield argued in his cultural history of Afghanistan that nomadic groups like the Ghilzai Pashtun had long profited from synchronizing caravan trade with their migrations (Barfield 2010:95; Hopkins 2008: 122). The paths and routes created by seasonal movements of nomadic pastoralists have been argued to be central in the development of overland routes in Central Asia (cf. Frachetti et al. 2017). Following on work that has been done in other geographic areas to re-insert pastoralists and hunter-gatherers into the early modern world system (Morrison 2002; Junker 1998), entangling (but not opposing) the standardized infrastructure of the Safavids and Mughals within the pastoralist landscapes of Afghanistan would further complicate our models of mobility and exchange for the early modern period. A second major question (or area of questioning) is, to what extent does the Afghan caravanserai system represent a

cultural collaboration between Safavid and Mughal models of governance? We have been struck by the similarity of our caravanserai buildings to contemporary structures to both the east and west; given the shifting nature of sovereignty over Afghanistan in the 17th century, these caravanserais were, if not built, then perhaps managed by factors of both empires in a joint effort to support travel through Afghanistan. Given our project's 'space-down view,' we are constrained in our ability to trace the patronage or origin of individual buildings. We hope that through ongoing collaboration with partners in Afghanistan the level of detail in our reconstructions will increase, enhancing our focus on inter-Asian cultures of hospitality and politics in the early modern period.

9 Conclusion

In this paper, we have presented new data on the early modern period in Afghanistan, an under-researched period in Afghanistan's history and a developing section of the country's cultural heritage. Our compiled dataset of 81 standardized caravanserais and the routes that they constitute also makes up a significant data contribution to the discussion of early modern political economy in Central Asia. Our country-wide data show an investment in infrastructure across the entirety of Afghanistan, crossing both fertile valleys and harsh desert landscapes. We have dated the installation of standardized caravanserais at regular intervals to the early modern period, specifically the 17th century. Our data thus further demonstrate a commitment at the level of imperial political culture, on the part of the Safavid and probably also Mughal empires, to providing safety and comfort to the merchants and other travelers moving between the cities of Afghanistan. The scale and regularity of the caravanserai system in Afghanistan requires us to shift paradigms of thinking about overland trade in this 'interstitial' part of Central Asia, from the image of itinerant peddlers which long informed western histories of the early

modern Persian economy, to an archaeological awareness of politics operating through deliberately constructed infrastructure.

According to Simone, infrastructure "configures specific engagements and circuits of exchange and attention" (Simone 2012). An infrastructural landscape like that constructed in Afghanistan configured the capacity of strangers to pass safely through mountains and deserts, and wildernesses inhabited by bandits, thus mediating the transformation of potentially hostile nature into safe and hospitable culture. But as the materiality of caravanserai architecture and the early modern institutions of road duties, taxes, and even states were unstable, so the infrastructural configuration of the caravanserai network transformed over time in its affordance and perceived significance. From an archaeological perspective, we can study the ways that caravanserais in different stages of ruination are repurposed as building material, as house walls, or as campsite windbreaks; at the same time, we observe the persistence of the routes of mobility through Afghanistan made possible by these stopping places.

The access to Afghanistan's archaeological past provided by the AHMP has allowed us an amazing opportunity to recover early modern infrastructural landscapes from above. Recording these networked spaces is important, as we provide a more textured look at the history of Afghanistan's participation in various "Silk Road" economies. This has critical relevance as global and local interests urge Afghanistan to assume a role as the "buckle" in China's 'One Belt One Road' policies, focused intensely on infrastructure and development frequently at the expense of Afghanistan's precious cultural heritage. By focusing in on the material architecture of travel infrastructure, and thinking about the labor and planning needed to build and maintain hundreds of miles of mud brick arches, courtyards, gates, wells and sleeping rooms, we end up thinking more about the dependence of economy on hospitality, and of global prosperities on local hosts.

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Appendices

Appendix 1. Tables

Table 1

1504	Babur, first Mughal emperor, occupies Kabul
1510	Safavid Shah Esmāʿil expands territories to northeast, occupying Merv and Herat
1528	Shah Ṭahmāsp defeats Uzbeks at Jam, retakes Herat; retakes Kandahar from Mughals
1587	Beginning of reign of Shah Abbas I; during his reign he consolidates Safavid hold on Sistan, Herat. During his reign (-1627) European travel in Persia expands
1622	Safavids under Shah Abbas I take Kandahar from Mughals
1722	Afghan rebel forces siege Isfahan, downturn of Safavid dynasty
1747	Ahmad Shah Abdali establishes Durrani Empire centered in Kandahar
1809	Durrani Shah Shuja aligns Afghanistan with Britain in the ‘Great Game’
1884-6	British Afghan Boundary Commission explores northern Afghanistan, dictates border with Russia

Table 2

Traveler	**Approximate travel dates**

R. Steel and J. Crowther*§	1615-6
B. Goës*	Early 17th c
S. Manrique	1642-1643
J- B. Tavernier*§	1630-1668
J. Chardin*§	1660s
R. Ker Porter	1817-1820
W. Moorcroft and G. Trebeck*	1819-1825
M. Lal	1832
J.P. Ferrier*	1845-1854 (rebuilding)
W. Ashe	1881
Afghan Boundary Commission	1880s

Table Captions

Table 1: Political and military timeline for early modern Afghanistan

Table 2: Travelers discussed in the text and whose accounts were used to reconstruct transit routes through Afghanistan. Asterix (*) denotes travelers whose routes are displayed in Figure 9. Section symbol(§) indicates early modern travelers who note functioning caravanserais. Light gray shading indicates a writer who describes ruined caravanserais; dark gray shading denotes a writer who describes ruined caravanserais in the territory of Afghanistan.

Figure Captions (all figures created by the authors except when otherwise specified)

1. A general map of the region of study, with cities mentioned in the text. *Source data: topography generated from SRTM 30-arcsecond elevation data, downloaded from usgs.gov; boundary data courtesy of ESRI; river data courtesy of hydrosheds.org.*
2. An historical illustration of a ruined Safavid caravanserai at Mahyar, drawn by E. Flandin in 1840 (Flandin 1851; used under public domain license from Wikipedia.org).
3. A section view of the route model, showing the generated station points (top) and confirmed caravanserai locations (bottom). *Source data: topography generated from SRTM 30-arcsecond elevation data, downloaded from usgs.gov; boundary data courtesy of ESRI; river data courtesy of hydrosheds.org.*

4. The caravanserai at Tirpul, as visible in a 1967 Corona satellite image. This caravanserai was destroyed subsequent to this date. *Image: Corona, KH4-A mission 2.75m-resolution image, March 3 1967. Imagery courtesy of CAMEL, Oriental Institute at the University of Chicago.*
5. A map showing the full results of the model-aided remotely sensed survey. *Data source*: *topography generated from SRTM 30-arcsecond elevation data, downloaded from usgs.gov; boundary data courtesy of ESRI; river data courtesy of hydrosheds.org.*
6. An architectural reconstruction (by K. Franklin) of the standardized E-type plan, based on high-resolution Buckeye aerial images. For comparison: the caravanserai at Khushkava, Farah province. *Data source: 30cm resolution Buckeye aerial image dated 2013.*
7. Composite figure of caravanserais of various forms and periods, including A. Islam Q'ala; B. Qush Rabat; C. a caravanserai at Q'ala-i Fath; and E. a caravanserai-form structure at Zindajan, now covered by modern buildings. *Imagery sources: 50cm resolution Worldview satellite imagery from the DigitalGlobe Corporation (A, B, C, D) and 30cm resolution aerial imagery provided by the US Buckeye Program (E and F).*
8. Examples of the "E-type" standardized caravanserai. *Image source: aerial imagery dated 2011-2013, provided by the US Buckeye Program.*
9. A map showing sections of early modern and modern travelers routes through Afghanistan, reconstructed by the authors.
10. An historical illustration of the caravanserai at Izadkhast, drawn by J. Chardin in the 1670s (Chardin 1811; used under public domain license from Wikipedia.org).

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